

THE EFFECT OF KNOWLEDGE OF MISSING
AN EXPERIMENTAL TREATMENT ON BEHAVIOUR

CENTRE FOR NEWFOUNDLAND STUDIES

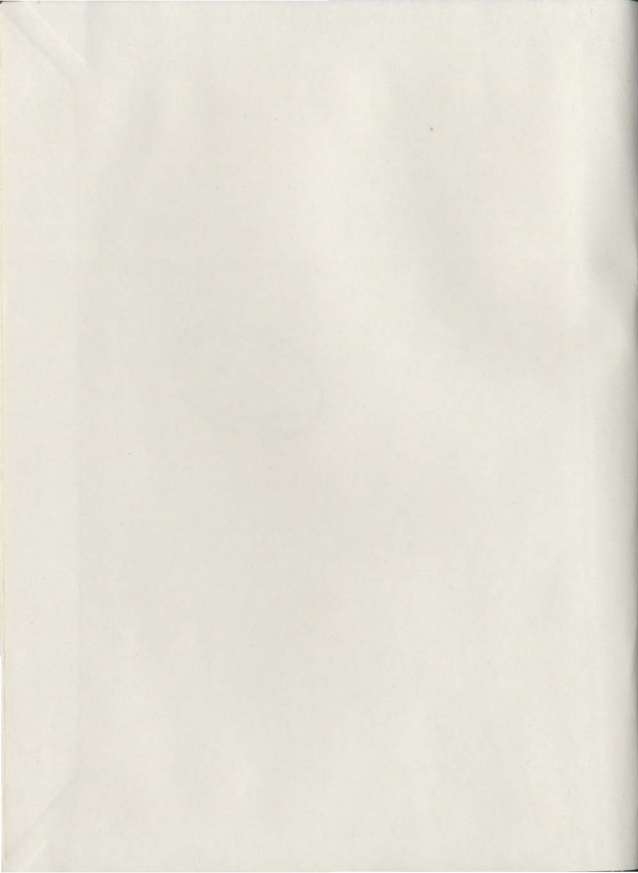
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THE EFFECT OF KNOWLEDGE OF MISSING AN
EXPERIMENTAL TREATMENT ON BEHAVIOUR

By



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A Thesis submitted in partial fulfillment
of the requirements for the degree of
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Abstract

The research examined how individuals react when they know they are missing an experimental treatment as a function of assignment to a control group and considered whether these reactions could produce treatment effects. There were three experimental conditions. Subjects in one condition were informed that they were a control group and unlike the experimental group would not receive extra money for doing well on experimental tasks. Subjects in a second condition were informed that they were in a control group and unlike the experimental group would not receive electric shocks for poor performance on experimental tasks. In the third condition subjects were given no information concerning the existence of any other condition. Dependent measures included task performance and measures of attitudes toward the experiment. Subjects who believed they were missing a positive treatment tended to be less careful, make more errors, and do less work than subjects unaware of any other condition. Subjects who believed they were missing a negative treatment tended to be more careful, make fewer errors, and do more work than individuals unaware of any other condition. Apparently, knowledge of missing either a positive or negative experimental treatment does affect

behaviour. There were no differences in attitude towards the experiment as a function of experimental condition. These significant differences in task performance were discussed in terms of various social psychological theories, the evaluation of social programs, and Campbell's suggestion of "informed randomization".

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The scientific method is used by scientists as a means of determining cause and effect relationships among variables in order to make reliable predictions. To demonstrate the effect of an experimental variable all variables except the independent variable are held constant. If under these conditions there is a difference between the experimental and control conditions it can be concluded that the observed difference is a function of the experimental manipulation.

Within the last few decades social scientists have been taking the scientific method out of the laboratory and applying it to the evaluation of social programs. There are, however, a number of problems encountered when the scientific method is used in this way. These problems revolve around the requirement for random assignment of participants to treatment and control conditions. For example, many social programs currently being evaluated provide seemingly obvious benefits to the participants. Treatments may consist of special privileges and responsibilities for mental patients (Fairweather, 1964) or income supplements for welfare recipients (Watts, 1969). In

these cases the problem is that administrators often have qualms about assigning subjects to a control condition in which the participants do not get treatment "benefits".

Although the attitude of administrators toward random assignment is problematic, it poses no threat to the internal and external validity of the evaluation. Another problem associated with random assignment which does pose threats to both of these is the effect on the participants' behaviour, of having been assigned to the control group and thus not having gained the seeming benefits of the program. For instance, individuals randomly assigned to no-treatment conditions tend to drop out of studies more frequently than those assigned to treatment conditions.

Campbell (1971) has suggested a method of implementing randomization that avoids this difficulty. He argued that problems of treatment acceptance and differential attrition rate could be minimized if subjects were informed about the nature of the experiment and various experimental conditions before randomization took place. Subjects would be told that if they agreed to participate they would be randomly assigned to an experimental or control group.

Page 3

Thus, only subjects who were willing to serve in the condition to which they had been assigned would be admitted to the randomization pool. People uninterested in receiving the treatment would presumably drop out before randomization. Also, since all subjects would make a prior commitment to participate regardless of ultimate group assignment, the problem of differential attrition in treatment and control groups would be greatly reduced.

There are three possible shortcomings to Campbell's procedure. First it introduces a selection problem by restricting the subject sample to volunteers. This could threaten the external validity of the findings. Second, subjects would be aware of the randomization process and might, regardless of their own outcome, react negatively to arbitrary assignment to condition. Third, individuals aware that they are missing some benefit or suffering some loss might alter their attitude and behaviour.

Wortman, Hendricks, and Hillis (1976) examined the question of how participants in social programs might react to the process of random assignment and considered whether these reactions alone could produce apparent treatment

effects. Their experiment ostensibly involved an evaluation of a social program. Subjects were randomly assigned to either an experimental group which recieved a special benefit or a control group which did not. In one condition, the subjects were aware that there was another experimental group; in a second condition subjects were unaware of any other group and in a third condition the subjects became aware of the other group during the experiment. These latter subjects became aware by "accidentally" learning this fact from another participant. The dependent measures included subjective reactions to the project and willingness to participate over time. Overall, subjects who became knowledgeable during the experiment were more negative toward the project than the subjects in the other conditions who did not differ from each other. The results of the study by Wortman et al. (1976) led the authors to recommend that future experimenters use the method of informed randomization as the effect of the subjects becoming aware seemed adversely to affect their attitude toward the study.

Aside from avoiding the negative effects of people accidentally discovering that they are in a control condition, for ethical as well as practical reasons many—

studies have to inform participants whether or not they are members of a control or experimental group. For example, the U. S. Office of Economic Opportunity launched a large scale field experiment to test the effect of a guaranteed annual income. In this instance the families studied had to be informed of the need for experimental and control groups before the experiment was started.

An important question which has not yet been considered is the effect on attitudes or behaviour of the knowledge that one has been assigned to a control condition which involves missing a benefit or avoiding a penalty. In other situations, receiving or missing a desirable outcome by chance has been found to lead to changes in attitude, behaviour, and self view (see, e.g., Apsler 1972; Apsler, & Freidman 1975; Isen, & Levin 1972). In an evaluation situation control subjects, knowing what they are missing, may competitively strive to work harder and do better. Conversely, they may feel demoralized because of their misfortune. Control subjects who avoid a penalty may see their position as particularly lucky and therefore respond more positively and with greater motivation regardless of the nature of the experimental treatment. On the other hand they may feel uncomfortably guilty about the inequity.

In proper combinations these processes may enhance or reduce differences between experimental and control conditions.

To date there appears to be no experimental evidence that deals with this question directly. Certainly, if knowledge of one's participation in a control group does affect behaviour, researchers should know how the subject's behaviour may be altered since this would undoubtedly effect the external validity of any study. The present paper will focus on this particular question.

There are three theories which may be relevant to this issue. The first, Reactance Theory (Brehm, 1966), deals with the effects of restricting freedom on behaviour. According to this theory, the arbitrary assignment of an individual to a particular treatment or control condition might be perceived by the individual as a threat to his or her freedom. Placing an individual within the confines of a control group would function as a restriction of the freedom to choose to be in any of the experimental groups. The second relevant theory, the Theory of Inequity (Adams, 1963), deals with perceived justice and its effect on

behaviour. Is it fair, for example, that I should be in a control group while others reap the benefit of the experimental treatment? Finally, the Just World Hypothesis (Lerner, 1965) states that people have a need to believe their environment to be a just and orderly place where people usually get what they deserve. Each of these theories will now be discussed in more detail.

Reactance Theory

The theory deals with freedom of action and the effects of restricting this freedom on behaviour. In developing this theory Brehm (1966) made the following assumptions: (1) People have a subjective experience of freedom to do what they want, in a way they want, and when they want in regard to limited and specifiable areas of behaviour. (2) Behavioural freedom helps people justify their needs and avoid harm and pain. (3) The maximum amount of reactance (need to restore freedom) will occur when the most attractive alternative is eliminated or threatened with elimination. On the basis of these assumptions, it is hypothesized that when a specific behavioural alternative is eliminated or threatened with

elimination, individuals will be "motivationally aroused" to reassert their freedom, i.e., select that alternative.

The Reactance hypothesis has generated some research but support for it has not always been strong. One study that does support the hypothesis was reported by Worschel and Brehm (1971). They reasoned that if individuals become less co-operative when freedom is restricted and they experience reactance, they should become more co-operative when freedom is affirmed. The authors were able to demonstrate that when freedom was affirmed resistance and other negative consequences of coercion were reduced or eliminated. Subjects placed in a decision-making situation were found to be more willing to agree to the demands of a coercive influence after a confederate, acting to restore the subject's freedom, intervened by saying that the subject was not yet ready to make a decision.

Heilman and Garner (1975) also reported evidence consistent with the Theory of Reactance. Subjects offered a choice as to the mode of compliance were willing to comply with a request significantly more often than when a choice was not offered. In fact, their rate of compliance

was found to equal that of subjects who had received promises of reward.

The studies by Worschel and Brehm (1971) and Heilman and Garner (1975) demonstrated that it is possible to counteract the negative consequences of coercion either by directly reinstating freedom or by affirming the individual's right to exercise free choice. Further support for Reactance Theory has been reported by Brehm and Brehm (1966), Collins (1970), Gibbons (1976), Pallak and Heller (1971), Pennebaker and Saunders (1976), and Worschel and Andreoli (1974).

Taken together these experiments support the notion that individuals tend to reassert their freedom of choice if that freedom is curtailed. If this is the case, behavioural differences would be expected to occur when subjects have knowledge of other experimental conditions in which they are not permitted to participate. In an attempt to assert their freedom of choice, individuals who have knowledge of other treatment conditions may perform less well on assigned tasks, show up late or even miss their appointment with the experimenter altogether. Since

Reactance Theory states that the need to assert individual freedom is directly proportional to the attractiveness of the denied choice, the greatest behavioural response would be expected when the most attractive alternative was denied.

Theory of Inequity

Before a definition of inequity is given, two terms used by Adams (1963) should be introduced, "Person" and "Other". Person is any individual for whom inequity exists. Other is any individual in an exchange relationship with Person or with whom Person compares when both are in an exchange relationship with a third party. Inequity exists for Person when he or she perceives that the ratio of outcomes to inputs and the ratio of Other's outcomes to Other's inputs are unequal. This may happen either when Person and Other are in a direct exchange relationship or when both are in an exchange relationship with a third party and Person compares with Other. The values of outcomes and inputs are as perceived by Person.

The discrepancy between the ratio of Persons' and

Others' inputs and outputs will be zero and equity will exist under two circumstances. First, the ratios will be equal when Person's and Other's inputs are equal and their outcomes are equal. This would be the case, for example, when Person perceived that Other's wages, job, and working conditions were the same and that both were equal on such relevant inputs as skill, seniority, education, age, effort expended, physical fitness, etc. Secondly, the ratios will be equal when Person perceives that Other's inputs are higher (or lower) than his or her own and Other's outcomes are correspondingly higher (or lower). A subordinate who compares with a supervisor does not feel unjustly treated by the company that employs them both, because the supervisor's greater monetary compensation, better working conditions, and more interesting and varied job are matched on the input side of the ratio by more education, a wider range of skills, greater responsibility and personal risk, more maturity, and longer service.

From the definitions of inequity it follows that inequity results for Person not only when Person is relatively underpaid but also when relatively overpaid. This proposition received direct support from experiments by Adams and Rosenbaum (1962) and by Adams and Jacobsen

(1964) in which subjects were inequitably overpaid. Individuals who were overpaid tended to work more efficiently and take shorter breaks. Further support was provided by Arrowood (1961) who paid subjects in advance for three hours work and found that those who perceived their pay to be too great tended to work more than three hours. Other support for Inequity Theory comes from studies by Homans (1963) and Pachen (1961).

In the context of the present study individuals would experience inequity if they knew that others were being paid more or less for doing the same work. In general, the Theory of Inequity suggests that individuals who perceived themselves to be in an inequitable position will attempt to restore equity by changing either their behaviour or their cognitions. Thus to restore the imbalance subjects would be expected to employ one of two strategies. First, if others were paid more for the same work subjects could decrease their input to match their outcomes, i.e., perform less well. Secondly subjects could change their cognition of the input:output ratio in order to perceive a balance. For example, individuals employing the second strategy might see the experimental task as more interesting and more worthwhile than they first supposed.

The Just World Theory

Lerner (1965, 1970, 1977; Lerner, Miller & Holmes, 1976; Miller, 1977) formulated the Just World Hypothesis which states that individuals need to believe that they live in a world where people generally get what they deserve. The justness of the fates of others has a direct effect on individuals' perception of their own fate. If others can suffer unjustly, then individuals must admit to the unsettling prospect that they too could suffer unjustly. As a consequence of this perceived interdependence between one's own fate and the fate of others, individuals confronted with an injustice generally will be motivated to restore justice. One way to do this is by acting to compensate the victim. Another is by persuading oneself that the victim deserves to suffer (Lerner, 1970). Victims can deserve their fate as a consequence of having a "bad" character or as a consequence of engaging in "bad acts". Thus, good people can deserve a bad fate if their actions are careless or foolish.

Various sources have noted the tendency of people to blame victims of misfortunes for their own fates. Goffman (1963), for example, has remarked that it is common for people to view the physical disabilities of others as

evidence of a moral defect or as just retribution for something their parents did and, hence, justification for the way they are treated. Myrdal (1944) and Ryan (1971) have also recognized that the treatment of oppressed or disadvantaged groups is often justified by claiming that they deserve their fate. Heider (1958) described the tendency of people to see consistency between outcomes and virtue as follows:

"The relationship between goodness and happiness, between wickedness and punishment, is so strong, that given one of these conditions, the other is frequently assumed. Misfortune, sickness, accident, are often taken as signs of badness and guilt. If O [any individual] is unfortunate then he has committed a sin." (p. 235).

Lerner (1966) found that subjects who learned that a fellow student had been awarded a cash prize as a result of a random draw were likely to conclude that she had worked harder than one who lost the draw. Of particular interest was the fact that although the observers had a clear preference for one of the two students, this did not interfere with their tendency to match the student's

performance with her fate. A study reported by Walster (1966) also showed how observers matched attributions of responsibility with outcomes. Walster found that the more harm created by an automobile accident the greater was the responsibility that subjects assigned the owner of the vehicle involved.

The prototype for a series of experiments on the Just World Hypothesis was conducted by Lerner and Simmons (1966). In this experiment, female subjects watched a fellow student on a video tape react with apparent pain to a series of supposed electric shocks. Subjects believed they were participating in a human learning experiment and that the victim was receiving shocks as punishment for her errors.

In one condition, subjects had an opportunity to compensate the victim by reassigning her to a reward condition in which she would receive money rather than shocks. In this condition subjects were actually able to restore justice. The results indicated that the subjects took advantage of this opportunity to compensate the victim. In another condition the subjects could not reward

the victim and were informed that the victim's suffering would continue. When the subjects were asked to evaluate the victim at this point, significant differences appeared between conditions. Subjects in the victim compensation condition rated the victim more favourably than did subjects in the uncompensated condition in which the injustice was presumably greater. This tendency to derogate the victim was especially pronounced in a third condition in which subjects were led to believe that the victim had allowed herself to be talked into being shocked for the observers' sake and for the sake of the experimenter.

It seems that the sight of an innocent person suffering without the possibility of reward or compensation motivates people to derogate the victim in order to bring about a better fit between her fate and her character. This general finding has been replicated a number of times with diverse populations (e.g., Simmons & Pilvan, 1972; Sorrento & Hardy, 1974; Johnson & Dickinson, 1971).

Research has also been carried out concerning the reactions of individuals to written and verbal reports of

the suffering of others. Macdonald (1972) confronted his subjects with the report of a stabbing in which the innocence of the victim was varied. The results revealed that the less responsible the victims were for their fate, the lower was their rated attractiveness. Apparently, the more responsible the victims were, the less was the perceived injustice and the weaker the need to derogate the victim. This result has also been found to occur with written reports of rapes (Jones & Aronson, 1973; Smith, Keating, Hester, & Mitchel, 1976).

To summarize, it appears that it is possible to threaten a person's belief in a just world in a variety of contexts with predictable results. Even verbal portrayal of a victim's suffering may be sufficiently arousing to threaten an observer's belief in a just world. However, not all victims will be derogated. If the victims can be compensated, or if the victims are perceived as being responsible for their own fate, they may not be derogated. If an attractive person or one of high social status is victimized, observers appear to restore the sense of justice not by derogating the victim but by exaggerating the person's responsibility for his or her fate. Victim derogation will not occur if observers expect to be in the

victim's position or a similar position (in which case empathy occurs), or if rules of procedure give the victim the same chance of escaping the undesirable consequences as others are given. It is evident from the above studies that there does not have to be an explicit relationship between the fate of the victim and the fate or potential fate of the subject.

If one's opinion of others can be altered to maintain a view that the world is just, it is likely that self-perception can be altered in the same fashion. The literature that has been examined so far has referred to the individual's perception of others who had suffered some misfortune. The fact that people also seek explanations for their own misfortunes is well documented in the reports of individuals who have experienced suffering or injustices. For example, Bettelheim (1943) described the self-derogation that occurred with prisoners in concentration camps. Kubler-Ross (1969) discussed how people often come to grips with imminent death by blaming themselves for their fates.

Bulman and Wortman (1977) presented some evidence that

suggests blaming oneself may be functional. They engaged paraplegic victims of accidents in extensive interviews designed to assess ways in which victims made sense of their fate. They found that the more the victim blamed themselves for the accident, the better their subsequent adjustment.

Although little experimental work has been done on the question of self-derogation, some relevant data has been reported. Rubin and Peplau (1973) found that individuals who received high numbers in the 1970 draft lottery, and were unlikely to be drafted, experienced an increase in self-esteem immediately after the lottery. On the other hand, those who were assigned low numbers and were likely to be drafted, tended to experience decreased self-esteem even though they believed their fate was determined by chance.

Comer and Laird (1975) followed up some earlier findings indicating that individuals often choose to suffer as a consequence of having expected to suffer (Walster, Aronson, & Brown, 1966). For example, when subjects were assigned an unpleasant task such as eating a dead

caterpillar (Foxman & Radtke, 1970) and were given a short time to wait, approximately 80% then chose this unpleasant task when given the opportunity to perform a neutral task instead. Comer and Laird speculated that a possible reason for this was that the individuals had convinced themselves that they deserved this fate. In an experiment where subjects believed they would have to eat a dead worm, Comer and Laird found that a substantial number of these individuals offered lower evaluations of themselves on a self-evaluation questionnaire than did subjects in a control group.

In light of these findings, one would expect that individuals in a control group who were aware that others were performing the same tasks as they, but receiving a reward, might blame themselves for missing that reward. In operational terms these individuals, because of their lowered self-esteem, would be more likely to perform poorly on simple experimental tasks and to see the tasks as less desirable and less worthwhile. On the other hand, individuals who were aware that others were performing the same tasks as they, but receiving a punishment for making errors, might think of themselves as more deserving. In this instance these individuals, because of their increased

self-esteem, would be more likely to perform well on simple experimental tasks and to see the tasks as more desirable and more worthwhile.

To test the hypothesis that knowledge of being in a control group affects behaviour, the following experiment was conducted. There were two experimental conditions and one comparison condition. Subjects in one experimental condition were informed that they were in a control condition and would therefore miss a positive experimental manipulation, (i.e., a reward of \$1.50 for each page of a task completed correctly). Subjects in the other experimental condition were informed that they were in a control condition and would miss a negative manipulation (i.e., a 17-volt shock for each error). These two groups are, respectively, termed Missing-reward and Missing-punishment. In the comparison condition subjects were given a task to perform with no knowledge of any other conditions. Predictions for the various experimental conditions follow.

Missing-reward condition. Individuals paid to participate in a psychology experiment believed themselves to be randomly assigned to a control condition in which they were required to perform a series of simple tasks with no further remuneration. These individuals were aware that there was an experimental condition in which the participants were to perform the same task as they for which they were to be paid an additional sum for each task completed correctly.

The Theory of Reactance predicts that these individuals, in an attempt to restore their freedom, would be more likely to drop out of the study or sabotage the results by exhibiting poorer performance or by failing to follow instructions. It also suggests that individuals will either distort their cognitions or alter their behaviour and that the occurrence of one will greatly decrease the likelihood of the other. The Theory of Inequity makes the same general predictions, that is, individuals will change their behaviour or modify their cognitions in an effort to reduce perceived incongruities. For example, one way to reduce the inequity in the missing-reward condition would be to perceive the task as less tedious and more interesting. Another alternative

suggested by this theory would be that individuals could perform less well. The Just World theory predicts either that individuals will tend to view the members of the experimental group with more esteem or, on the other hand, they may derogate themselves thinking that they are not deserving enough to enjoy the benefit of the experimental condition.

Missing-punishment condition. This condition was the same as the missing-reward condition except that the individuals were informed that the subjects in the experimental condition (the condition to which they were not assigned) received an electric shock for each page of a task which they failed to complete correctly. A Theory of Reactance predicts behavioural changes in exactly the same direction for the missing-punishment condition as for the missing-reward condition. The Theory of Inequity predicts a lower drop out rate and better performance. The Just World Theory predicts that the individuals in the missing-punishment group would either derogate those in the hypothetical punishment group or increase their self-esteem and better their performance.

Method

Subjects

Twenty-four female and 24 male first-year undergraduate students between the ages of 16 and 19 were paid to participate in an experiment in social psychology. Subjects were randomly selected from a pool of volunteers, contacted by telephone, and asked if they wanted to take part in a psychology experiment. Five subjects declined.

Stimulus Materials

The following items were used in the experiment:

- (1) An excerpt from a standard first-year English history text that was typed single spaced on three pages with 54 typographical errors on each page (See Appendix A). The typographical errors were of two types, either the letters were reversed or a letter appeared too frequently in a given word, for example, "Knig" or "jjustice".
- (2) Sixty arithmetic problems that a ten year old child would be able to solve without difficulty (See Appendix A).
- (3) A multiple choice questionnaire designed to provide

information about the subjects' attitudes. The first three questions on the questionnaire asked subjects what their task was, which condition they were in, and how they were assigned to their condition. The next two questions asked for an evaluation of the experiment and the experimenter, and were followed by three questions aimed at discovering how the subject felt before, during and after the experiment. The final two questions asked the subjects if they would select for a future, similar experiment, individuals from the group they were in or those from the "other" group. Subjects were also asked which group they would have preferred to have been in had they had a choice.

Design

All three groups in the experiment were given the same tasks to perform. The difference between groups involved the information that the subjects were given concerning the treatment condition. The control group performed the tasks without any knowledge of other conditions. Subjects were simply informed that the experimenter was interested in task performance. The missing-reward group was informed that the experimenter was interested in the effect of reward on task

performance and that there was another condition in which subjects were paid extra for doing the same tasks. The missing-punishment group was informed that the experimenter was interested in the effect of punishment on task performance and that there was another condition in which subjects were punished for errors they made while doing the tasks.

Procedure

Subjects were greeted by the experimenter who led them to a small room and asked them to be seated at a desk in the center of the room. In one corner of the room there were some wires dangling from a fixture in the wall. As soon as the subject was seated, the experimenter handed him or her a sealed envelope containing the instructions. (See Appendix B). The instructions explained that the tasks consisted of a proofreading exercise and arithmetic problems and were contained in six numbered envelopes. (The arithmetic tasks were in the odd-numbered envelopes and the proofreading tasks were in the even-numbered ones). The instructions further stipulated that each envelope was to be taken in sequence, that the arithmetic problems were to be rounded to three decimal places and the typographical errors in the

proofreading task were to be indicated by circling them with the pen provided. As each page was completed the subject was requested to compose a three digit number, write it at the top of the page and deposit it into the envelope taped to the side of their desk. The instructions explained that it was necessary for the number to be on each page to enable the experimenter to keep all the papers done by the same person together and assure anonymity. After the first page was completed, numbered, and deposited in the envelope, the subjects were to begin on the second envelope, continuing this process until all pages were completed or the experimenter told them to stop.

At this point the written instructions differed for the three groups. The missing-reward group was informed that there were two conditions in the study, a control group that would simply do the tasks for the standard payment of \$3.00 and an experimental group that would receive an additional \$1.50 for each page of the tasks completed without error. The missing-punishment group was given the same information except they were informed that the other group would receive a 17-volt shock for each page of the task completed with an error. The control group was not given any information concerning the existence of other conditions.

The instructions reminded all three groups that it was permissible to leave the study at any time. After the subject indicated readiness to continue the experimenter took out a coin, flipped it, and informed the subjects that they were in the control group. (The action of tossing the coin was omitted for the control group). The experimenter then placed the six numbered envelopes in front of the subject as he reminded them to do the tasks in sequence and write their number on the top of each page as it was completed. The experimenter then told the subject to begin.

After 20 minutes the experimenter returned and informed the subjects that time was up. (No subjects completed all the pages in this time.) He collected the envelopes and handed the individual a questionnaire (See Appendix C). When the subjects had finished, the experimenter told them that the experiment was over, paid them, and asked them if they would mind answering one more question that was on a form by the exit. This final question asked if they would volunteer for a similar experiment to be conducted in the near future. A place was left at the bottom of the page for the subjects to sign if they wanted to participate, and a box to check if they did not want to participate.

Results

Manipulation Check

The first three questions of the questionnaire were intended to check on the subject's understanding of the experimental manipulation. They asked, (1) "How many conditions other than your own did the experiment have? (2) Which condition were you in? and (3) How were you assigned to your condition?" Twelve subjects made one or more errors in answering these questions (See Table 1). Three of these subjects responded incorrectly to question one, four to question two, and seven to question number three. The frequency of errors was too low to allow a statistical test to be done, but the incorrect responses appear to be evenly distributed across conditions. Subjects who failed to answer the manipulation check questions correctly were included in all the analyses even though this procedure may introduce a slight conservative bias.

Table 1

Number of Subjects in Each Condition Who
Answered the Questions Incorrectly

Questions, 1, 2, & 3	Missing-punishment	Control	Missing-reward
How Many Conditions Did the Experiment Have ?	1	1	1
Which Condition Were You in ?	2	1	1
How Were You Assigned To Your Condition ?	2	2	3

Task performance

The tasks, arithmetic problem solving and proofreading, were analysed by means of two one-way analyses of variance. The independent variable was the experimental condition, the dependent measures were the percent of correct responses in the arithmetic task and the number of typographical errors detected in the proofreading task. (See Table 2 for means). The percent correct scores were analyzed following an arc sine transformation. The analyses of variance revealed a significant main effect of experimental condition for both proofreading $F(2,45) = 11.180, p < .01$ and arithmetic problem solving, $F(2,45) = 6.438, p < .01$.

On both performance, tasks the missing-reward group scored the lowest and the missing-punishment group scored the highest. A Newman-Keuls test indicated that the difference between the missing-punishment subjects and the control subjects was significant for both the mathematical ($p < .01$) and the proofreading tasks ($p < .001$). In the missing-reward condition neither the performance on the mathematics task ($p < .08$), nor the proofreading task ($p < .06$), differed significantly from the control group. However, the results were in the predicted direction and with a slightly

Table 2

Mean Number of Errors Detected in Proof-reading Task and
Mean Percent Correct in Arithmetic Problems

Condition	Arithmetic	Proof-reading
Missing-punishment	46.69	36.13
Control	38.25	23.63
Missing-reward	29.89	16.53

larger sample would probably have been significant. The performance difference between the missing-reward group and the missing-punishment group was significant in the proofreading task ($p < .0001$) and in the mathematics task ($p < .001$).

These results indicate that subjects led to believe that others were performing the same tasks for more pay, tended to perform less well on both mathematical and proofreading tasks than subjects unaware of any other condition. Conversely, subjects who were led to believe that others were performing the same tasks but being punished for their errors performed better on both tasks compared with the subjects unaware of any other condition.

To determine if subjects attempted to increase the speed of their performance the total number of mathematical questions completed, regardless of whether or not the solution was correct, was analyzed using a one-way analysis of variance. The analysis revealed that there was a significant difference between groups $F(2,45) = 3.23, p < .05$. The Newman-Keuls tests indicated that the only significant difference was between the missing-reward condition ($M =$

23.88) and the missing punishment condition, ($M = 37.31$, $p < .05$). The differences between the missing-punishment group and the control group ($M = 30.56$) and the missing-reward group and the control group were not significant ($p < .25$). Thus subjects who missed a punishment completed more problems overall than did subjects who missed a reward. The proofreading task was not similarly analyzed as it was not possible to determine exactly how far an individual had read beyond the last typographical error detected.

The findings suggest that individuals tend to change the quality of their performance as a function of the belief that others are rewarded or punished for performing the same task. If individuals believe others are receiving punishments for their mistakes while they are not, they tend to be more careful, make fewer errors, and do more work. On the other hand, if subjects believe that others are receiving rewards while they are not, they tend to be less careful, make more errors, and do less work.

The last behavioural measure was the number of "misinterpretations" of instructions across groups. Errors

that reflected a failure to follow instructions rather than being attributable to the subject's inability to perform the task as requested were classed as errors of misinterpretation. For example, if a subject were to skip all the proofreading tasks and do only the arithmetic tasks or to skip over a section in the math, an error of misinterpretation would be scored for that subject. If an individual made a particular kind of error, one point only was scored no matter how often the error was repeated. For example, if a subject were to skip questions (do the tasks out of sequence) he or she would be scored only one point no matter how many questions were skipped. A case that illustrates the procedure is that of a subject who divided the numerator into the denominator. All the questions that were done in this fashion, if they were arithmetically correct given the inversion, were scored as correct while at the same time this individual was scored with one misinterpretation error.

No subject made more than one kind of misinterpretation error, thus subjects who did make such errors were scored one while those who did not were scored zero. The missing-punishment group made the fewest errors (2), the control group made more errors (6), and the missing-reward

group made the most errors (12). A Chi-square test was performed and revealed the differences between groups to be significant ($\text{Chi-Square } (2) = 7.6, p < .03$). Overall, those individuals who thought they were missing a benefit had more errors and misinterpreted the instructions more frequently than those in the control group. Conversely, individuals in the missing-punishment condition had fewer errors, and misinterpreted the instructions less frequently than the control group.

Cognitive change

The questionnaire was designed to measure cognitive distortion or emotional change that might have occurred as a function of the experimental manipulation. The questionnaire was divided into three main components (other than the manipulation checks already discussed): (1) The subjects' perception of the experiment and the experimenter. (2) The subjects' perception of themselves before, during and after the experiment. (3) The subjects' perception of those individuals in the "reward" and "punishment" conditions.

Perception of the experiment was measured by question

five which asked subjects' to rate the experiment on four dimensions using a seven point scale. The dimensions were interesting - dull, pleasant - unpleasant, excellent - terrible, and worth doing - not worth doing. Separate analyses of variance were performed for each dimension. There were no significant differences between groups (See Table 3). The subjects' perception of the experimenter was measured in the same fashion by question six using three dimensions. The dimensions were, (1) Competent - Incompetent, (2) Pleasant - Unpleasant, and (3) Intelligent - Unintelligent. A separate analysis of variance performed on each dimension revealed no significant differences between groups (See Table 4).

The second component of the questionnaire measured the subjects' self-perception. Questions seven to nine asked subjects to rate how they felt before, during and after the experiment on a seven point scale from good to bad. Question ten asked individuals to rate how well they had performed on the experimental tasks. Analyses of variance performed on each question revealed no significant differences between groups (See Table 5).

Table 3^a
Mean Score of Opinions of Experiment (Question 5)

Dimension	Missing-punishment	Control	Missing reward	F
Interesting	3.68	3.56	5.31	2.594 (n.s.)
Pleasant	3.69	3.38	3.19	0.057 (n.s.)
Excellent	3.18	3.69	3.88	0.365 (n.s.)
Worth	3.00	3.16	3.06	0.231 (n.s.)

^a A higher score indicates a more negative opinion.

Table 4
 Mean Rating of Experimenter (Question 6)

Dimension	Missing-punishment	Control	Missing-reward	F
Competence	2.38	2.25	1.88	1.029 (n.s.)
Intelligence	2.50	2.06	2.56	0.347 (n.s.)
Pleasantness	2.69	2.00	2.25	0.619 (n.s.)

^a A higher score indicates a more negative rating.

Table 5
Mean Self-esteem Scores Before, During, and After Experiment

Dependent Measure	Missing-punishment	Control	Missing-reward	F
Before Experiment (Question 7)	2.83	3.56	3.25	0.151 (n.s.)
During Experiment (Question 8)	3.13	3.38	3.63	0.669 (n.s.)
After Experiment (Question 9)	2.63	3.38	2.81	1.444 (n.s.)
Performance (Question 10)	4.19	4.31	4.69	0.613 (n.s.)

The third component of the questionnaire consisted of three questions, numbers four and eleven on the questionnaire and number twelve which was on a separate sheet of paper given to the subjects as they left. Question four asked, "Which condition would you have preferred to have been in? (a) Shock, (b) Control, (c) Reward, (d) Team, and (e) Other. A Chi-square test revealed no significant differences between groups ($\text{Chi-square}(2) = 0.084, p > .05$). (See Table 6). Question eleven read, "We may be conducting another experiment involving a game of chance. If you could choose your partner would you select someone from the group you were in for this experiment or someone from the other group in this experiment. Again, there was no significant difference between groups ($\text{Chi-square}(2) = 1.375, p < .30$). (See Table 6) The question asked at the end of the experiment requested individuals to volunteer for a future similar experiment. Subjects who did not want to volunteer were asked to indicate their response by placing their number on the sheet. Ninety-two percent of the subjects volunteered for the future experiment. (See Table 6).

Table 6
Choice of Action for Future Experiment

	Control Reward	Missing-punishment	Control	Missing-reward
Preferred Condition (Question 4)		8 6*	1 8*	5 7
Choice of Partner (Question 11)	Control Other	8 7	8 6	10 6
Volunteer for Future Experiment (Question 12)	Yes No	16 0	15 1	13 3

Discussion

The hypothesis that knowledge of other treatment conditions within an experiment would affect behaviour was tested and supported. Before the results and subsequent implications are discussed it seems prudent to introduce and discuss the issue of experimental demands that may have had an effect on the results obtained.

There are two major varieties of bias that may intrude into social-psychological experiments: bias due to the subject's perception of the demand characteristics of the experimental situation (MacDonald, 1965; Orne, 1962; Riecken, 1962; Rosenberg, 1966, 1969) and bias due to the unintentional influence of the experimenter (Rosenthal, 1966, 1969). The possibility of either type of bias raises questions concerning the validity of an experiment.

Bias due to demand characteristics is much like the placebo effect in medical research. In testing the effects of new drugs doctors often give some subjects a drug and others a pill that looks like the drug but contains no active ingredients (a placebo). On the average about one

third of the individuals in the placebo group report that they feel better. Objective tests indicate that the symptoms of the people in this group are often, in fact, reduced (Beecher 1959).

In a social-psychological experiment the subjects know they are in an experimental situation. They are aware that they are being observed and that certain behaviour is expected of them. It is reasonable to assume, therefore, that subjects respond not only to the experimental manipulations but also to their own interpretations of what kind of behaviour the manipulations are supposed to elicit. Even if subjects are told specifically that there is no correct response, they may assume that there are answers that will enhance or diminish their standing in the eyes of the experimenter. They may be motivated by the desire to make a good impression or to "help" the experimenter.

This particular kind of bias would not jeopardize the external validity of the results of the present study since the purpose of the study was to duplicate a situation that occurs in the evaluation of social programs, i.e., these demands may very well exist for the population to whom the

results will be generalized. Demand characteristics that affect those involved in control groups in actual evaluations of social programs would also affect those involved in the present study. It is only in laboratory experiments where the demand characteristics may elicit responses unlike those elicited in a normal environment that this kind of bias raises questions about the external validity of the results.

The other source of potential bias is experimenter bias. Researchers differ in sex, skill, technique, personality and many other factors, all of which can interact with experimental operations. To avoid any experimenter bias the experimenter was unaware of the condition to which the subject was assigned until the treatment had been administered. The instructions were given to the subject in writing with verbal communication restricted as much as possible. It is therefore unlikely that there would be any effects as a function of experimenter induced bias.

In terms of the different theories, the one which seems to receive the most support from the experimental results is

the Theory of Inequity (Adams, 1963). Subjects in a situation of inequity seemed to adjust their behaviour to reduce the inequity. As the theory predicted, subjects in the missing-punishment condition did better on both arithmetic and proofreading tasks than subjects in the control condition. For these subjects missing a punishment seemed to create the impression that they had received the better treatment relative to the punishment condition. Thus these individuals appeared to feel that they owed the experimenter more effort. Over all they had a higher percent of arithmetic problems correct, completed more problems and made fewer misinterpretation errors. Conversely, in the missing-reward condition subjects appeared to feel that they had been denied the better treatment and altered their performance in the opposite direction. They made more errors, completed fewer problems, and made more misinterpretation errors than did the control group. The failure to find significant effects with the questionnaire is not a problem for the Inequity Theory as it suggests cognitive distortion should only occur if the individual was unable to restore equity by behavioural means.

The Theory of Reactance (Brehm, 1966) received partial support. As the theory predicted subjects made more misinterpretation errors in the missing-reward condition than in any other condition. In this instance the misinterpretation errors can be viewed as an effective means of asserting one's freedom. It is as though the individual reasons, "I may be in an experimental condition. I do not like, but I still have the freedom to perform in any manner I please". The fact that most of the misinterpretation errors occurred in the missing-reward condition lends direct support to Brehm's hypothesis that the maximum amount of reactance will occur when the most attractive of the available alternatives is eliminated.

However, Reactance Theory is not supported by the data from the missing-punishment condition. The prediction that individuals react to any restriction of their freedom would lead us to expect the missing-reward condition to elicit more misinterpretation errors than the control group who were not presented other possible alternatives. However, this was not the case. It is possible that individuals who were placed in the group which they would have chosen did

not perceive that they had their freedom to choose between two groups restricted. Even if this explanation is correct, it still runs counter to Reactance Theory as presented by Brehm (1966).

Reactance Theory made no direct predictions concerning the response to the questionnaire. However, it did predict that in an effort to restore perceived freedom, the individuals in the missing-reward condition would be less likely to volunteer for future experiments. Out of the 48 subjects that participated in the study, 4 individuals declined to participate in a future study. Three of the four were from the missing-reward condition and one from the control group. While very weak, the results are in the predicted direction.

Finally, there was no evidence that any of the subjects derogated either themselves or others as the Just World Theory predicts. It could be that subjects did not perceive as unjust the situation of others receiving more money or 17-volt shocks while performing the same task. Perhaps the fact that all subjects were paid to participate was enough to prevent this perception. Another possibility is that a

17-volt shock may simply not be great enough to induce the perception of injustice. In any event, the present study was unable to find any support for the Just World Hypothesis.

The fact that the difference in performance for the missing-reward condition was not quite statistically significant may be explained by various artifacts associated with the experiment. First, it should be pointed out that in the present study all subjects were paid to participate. The subjects could have easily concluded that, although they were not given the chance to earn extra money, they did come away with some money. If subjects were not paid at all and knew that others were being paid for doing the same task, these differences might have been greater.

Second, this was a laboratory experiment and as such, divorced to a certain extent from the "real world". The small sum of money subjects were paid for each page completed correctly would, in all probability, not be perceived as being as valuable as other possible benefits. For example, the differences might have been more pronounced if a medical treatment were to be withheld, or a new

technique for weight loss, or any other desired treatment. In all likelihood, the reason such a pronounced performance increase was noted in the missing-punishment condition can be explained in the same fashion as the marginal performance decrease noted in the missing-reward condition. A painful electric electric shock is likely to be a lot more important to avoid than a reward of \$1.50 is to acquire.

Campbell (1971) expressed the fear that external validity might be threatened by using subjects who were aware of the experimental manipulation. It was in response to this concern that Wortman, Hendricks, and Hillis (1976) conducted their study on the reactions to random assignment. They suggested, in light of their results, that "Campbell's fear that external validity would be jeopardized by using aware subjects is unduly pessimistic" (p 261). The results of the present experiment suggests that Campbell's fears were justified. Wortman et al. were looking at the effect of being aware of other experimental conditions on the subjects' attitude toward the study. They found attitude change only for those subjects who became aware of other treatment conditions during the experiment. But they did not examine behaviour change directly, as did the present paper.

The results of the present study are congruent with the results reported by Wortman et al. (1976) in terms of the attitudes of "aware" subjects about the experiment. That is, in both experiments knowledge of another group receiving benefits did not affect attitudes toward the experiment. However, the present study did detect a significant behavioural difference between conditions. The implication seems to be that if subjects have no behavioural means by which to balance inputs and outputs, their cognitions will be distorted, that is, they will change their attitude. Since no behavioural measure was taken in the Wortman et al. study (1976), subjects could easily have changed their behaviour without detection. Subjects fully informed in advance were able to assess their situation and adjust their behaviour in some manner or other. For example, the subjects might speak to friends about the study even though asked not to (a misinterpretation error), or they might be less cooperative in returning questionnaires. This explanation would need empirical support before being accepted. However, it does explain why attitude change was not noted in the present study and attitude change was noted in the Wortman et al. (1976) study.

The present study suggests the following recommendations to evaluators of social programs. The traditional randomization strategy, in which participants are left unaware of the various experimental conditions, should if possible, be employed. If there is a high probability that subjects may become aware of the existence of other experimental conditions or if there are ethical reasons for informing participants of other treatments it is recommended that informed randomization be considered. However, if such action is deemed necessary, subjects should also be informed of the need for randomization and be promised the treatment after the study has been completed. Depending on the study, the researcher should weigh the relative risk of either course of action.

Some Precautions

It should be noted that the subjects in the present study were college students and that other populations may react differently to knowledge of different treatment conditions. Also, the data here were gathered immediately after the subjects learned the result of the randomization process (the flip of a coin). Subjects might very well respond differently at a later time. This point is

especially important and should be emphasized in the context of a pre-test post-test design. If knowledge of other less pleasant conditions leads subjects assigned to an innocuous treatment to score higher than control subjects on initial (pre-test) measures, analysis would incorrectly indicate an initial non-equivalence of the two groups. It is not unusual for pre-test measures to be collected immediately following subject assignment when the effects of knowledge of other groups and the randomization process may be the greatest.

The present experiment has demonstrated that knowledge of other treatment conditions can produce responses in subjects that will alter the outcome of the experiment. It remains for further research to demonstrate in a field setting that differences brought about by knowledge of other treatments are influential in a final assessment of program effects.

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APPENDIX A

ARITHMETIC TASKDIVIDE THE FOLLOWING:SCRATCH SECTION

1. $22/11=$
2. $74/15=$
3. $11/11=$
4. $35/07=$
5. $68/17=$
6. $57/19=$
7. $39/09=$
8. $30/10=$
9. $60/20=$
10. $60/30=$
11. $42/07=$
12. $42/06=$
13. $22/11=$
14. $40/05=$
15. $97/45=$
16. $87/78=$
17. $34/24=$
18. $89/56=$
19. $88/62=$
20. $78/33=$

ARITHMETIC TASKMULTIPLY THE FOLLOWING:SCRATCH SECTION

1. $20 \times 30 =$
2. $0 \times 13 =$
3. $19 \times 22 =$
4. $26 \times 11 =$
5. $30 \times 09 =$
6. $8 \times 17 =$
7. $5 \times 19 =$
8. $11 \times 15 =$
9. $2 \times 24 =$
10. $14 \times 10 =$
11. $27 \times 29 =$
12. $29 \times 28 =$
13. $42 \times 14 =$
14. $30 \times 27 =$
15. $21 \times 05 =$
16. $28 \times 31 =$
17. $49 \times 36 =$
18. $56 \times 27 =$
19. $33 \times 67 =$
20. $14 \times 19 =$

ARITHMETIC SECTIONADD THE FOLLOWINGSCRATCH SECTION

1. $13+45+65=$

2. $61+84+29=$

3. $61+43+34=$

4. $46+56+09=$

5. $09+07+93=$

6. $44+84+14=$

7. $19+78+54=$

8. $27+74+33=$

9. $50+54+67=$

10. $18+71+34=$

11. $63+66+25=$

12. $43+80+18=$

13. $19+64+23=$

14. $15+99+46=$

15. $43+87+78=$

16. $77+54+84=$

17. $18+67+23=$

18. $27+55+15=$

19. $58+78+54=$

20. $99+99+99=$

PROOF READING TASK.

The political importance of this decision is obvious in its bearing upon the States and their finances. But the principle is much wider, for the doctrine of the immunity of the instrumentalities was not limited to the industrial power. Its significance goes to the whole method of the interpretation of the Commonwealth constitution. Specific provisions in the constitution as in other statutes must be construed in the light of the whole, and the whole has a background which forms part of the material for interpretation. Thus as already seen, the High Court held early in its course that the inference to be drawn from the existence of the Crown's power to disallow Commonwealth or State statutes was limited by the notorious conventional limitations on the exercise of that power. As far back as 1907 the restraint on State Parliaments, implied by the High Court in *D'Emden, vrs. Pedder* from the nature of the federal relation, had been disapproved by the Privy Council in *Webb vs. Outtrim*, without either coercing the Australian Court by its authority or convincing it by its reasoning. But the fact that the constitution, both by specific description and by its structure, was federal in nature, was invoked by the Privy Council as a principle for ascertaining powers of the Commonwealth Parliament in *A-G for Australia vs. Colonial Sugar Refining Company*.

In a constitution it is even less possible than in more detailed legislation to avoid implications or inferences in the determining the extent of the subject-matter over which power is granted or reserved. But neither the American or the Australian constitution can be explained in the light of federalism alone. In the United States, the essentials of federalism were developed in conditions which precluded any exaggerated respects for the acts of Legislatures as such. Succeding the colonial legislatures, which were themselves subject to various restraints based on their dependent condition or on an individualistic political philosophy, legislative bodies were conceived of even legally as holding their powers not as inherent but as derived from the people and upon a trust. These conditions reinforced the express limitations upon Federal and State Legislatures alike, with which the constitutions abound. In Australia these constitutions were absent, and the Legislatures had grown up in an atmosphere of parliamentary sovereignty, with the traditional attributes of British parliamentary institutions, so far as these were possible in a non-sovereign community. So the Privy Council had decided before confederation was accomplished. Part of this system also was responsible government, the responsibility of the executive to the legislature, a principle which, in the words of Lord Haldane in the House of Commons in 1900, permeated the constitution. The earliest decisions of the High Court considered that federalism was the dominant principle, and found a guide chiefly in the decisions of the United States, while recognizing that in many matters there were differences which prevented the analogy from being perfect.

But from 1906, when two additional Justices were appointed to the Court, a different note began to make itself heard, sometimes in judgments which cautiously avoided reliance on American principles, sometimes in dissenting judgments which rejected them, in either case emphasizing the differences between the American and Australian constitutions, and finding the relevant authorities in principles laid down by the Privy Council, even if such decisions were given in reference to purely unitary constitutions, or to a constitution so different in its federalism

from Australia's as that of the Dominion of Canada. A good illustration may be found as early as 1912, where the majority of the High Court held invalid a New South Wales Act excluding undesirable persons, on the ground that the continuance of such a power to its full extent after federation was inconsistent with the elementary notion of a Commonwealth, following therein the "police power" decisions of the Supreme Court of the United States of America. Isaacs and Higgins, JJ., while concurring in the decision, based their opinion exclusively on the express prohibition of interference with freedom of intercourse among the States by Section 92. Finally, the minority became the majority, and in 1920 the whole Court with one dissenter rejected the doctrine of "implied prohibitions" as formed on a vague and individual conception of the spirit of the impact, not the result of interpreting any specific language, and not referable to any recognized principle of common law of the institution.

In the long drawn out controversy in the High Court, it is probably true that over-statement on one side led to some over-statement on the other. The principles of federalism led to the earlier decisions of the High Court to enunciation of some rules of construction which found little support in professional opinion. But if the parliamentary nature of the constitution and the responsible government which "permeates" it are informing matters which may guide its interpretation, not less must that be true of its federal nature and scheme, which is as at least as explicitly stated in the text. All three appear intact to be relevant: the weight that may attach to each is not capable of statement in general form; and there remains the question—incase of conflict, which prevails? The state of the authorities points to the predominance of the British parliamentary principle as against federalism as interpreted in the United States. A practical demonstration is found in the substantial disuse of American authorities in argument to-day, while in the earlier years of the Court, the Reports of the Supreme Courts of the United States formed part of the library of every man in leading practice at the bar.

Judicial controversy has extended to another field: the distribution of the judicial power itself. It has involved the relations of the High Court of Australia and the Privy Council in questions as to the constitutional powers of the Commonwealth and the States: the power of Commonwealth Parliament, in committing federal jurisdiction to State Courts, to affect the appeal to the Privy Council from decisions in their jurisdiction to State Courts, to affect the appeal to the Privy Council from decisions in their jurisdiction, the nature of the federal jurisdiction, and whether it can exist in a State Court when the court already has ample jurisdiction over the matter by State law. In these matters the divergence of opinion between the State Court and the Privy Council on the one hand and the High Court on the other opened, at the very beginning of the High Courts history, a contest that would certainly have assumed a political importance, if the Privy Council had not declined further battle by using its discretionary power over the reception of appeals, and refusing leave to appeal. The subject-matter of the controversy has been

revived in the sharp differences disclosed, by the cases just cited, between the High Court of Australia and the Supreme Court of Australia and the Supreme Court of Victoria. But the minor political importance, of the subject, the intricacy of the questions, and the even greater intricacy of the discussions, which, in addition to differences on the authority of decisions actually decided, and involve not merely the interpretation of the constitution but the interpretation of specific Acts of Parliament- these things make the whole matter one to which justice can only be done in a professedly legal work. So far as concerns the class of constitutional questions provided by Section 74 of the constitution, in which no appeal is permitted to the Privy Council from any decision of the High Court except upon a certificate of the High Court itself that the question is one which ought to be determined by the King in Council, the High Court has scrupulously guarded what it conceives to be the trust imposed on it. Accordingly, it has not considered that the question is one which ought to be decided by the King in Council when, a divergence between the opinion of the Privy Council and the High Court having appeared, State Courts were doubtful whether they should follow the one or the other; or when there were differences of opinion in the High Court itself; or when the High Court had over-ruled earlier decisions. A certificate of appeal was refused in the Engineers' case referred to above, possibly on the grounds that the Court was now affirming the principle of a Privy Council decision conflicting with the cases over-ruled. It granted a certificate in a case where the Court was equally divided.

A P P E N D I X B

(MISSING-PUNISHMENT CONDITION)

INSTRUCTIONS, PLEASE READ CAREFULLY.

Thank you for participating in this study. We are interested in the effect of punishment on task performance. The tasks are to proofread and solve problems until the experimenter tells you to stop. You will be given sheets of paper some of which will have arithmetic problems to solve while others will consist of excerpts from a history text that contains a number of typographical errors. Take each sheet in sequence, either solve the problems (rounding to three decimal places) or in the case of the proofreading task, indicate the typographical errors by circling them with the pen provided. As soon as you have finished each page, place a three digit number in the upper right hand corner. This number can be any you wish to make up, just be sure the same one appears on each page. This allows us to keep all the pages done by the same person together, while making sure the person remains anonymous. After you have numbered the page you have just completed, place it in the envelope provided and start on the next until all papers are completed or the experimenter tells you to stop.

There are two groups in this study, a control group, who simply perform the task just described, and an experimental group, who will also do the above mentioned task but in addition receive a 17 volt shock for each page completed with an error. Individuals are assigned to each group purely by chance. If you have any questions please ask them now. If you have no desire to be in the experiment you may leave at any time. If you are ready to continue inform the experimenter and he will flip a coin to decide whether or not you will be in the control or experimental condition. Thank you.

(MISSING-REWARD CONDITION)

INSTRUCTIONS, PLEASE READ CAREFULLY.

Thank you for participating in this study. We are interested in the effect of reward on task performance. The tasks are to proofread and solve problems until the experimenter tells you to stop. You will be given sheets of paper some of which will have arithmetic problems to solve while others will consist of excerpts from a history text that contains a number of typographical errors. Take each sheet in sequence, either solve the problems (rounding to three decimal places) or in the case of the proof reading task, indicate the typographical errors by circling them with the pen provided. As soon as you have finished each page, place a three digit number in the upper right hand corner. This number can be any you wish to make up, just be sure the same one appears on each page. This allows us to keep all the pages done by the same person together, while making sure the person remains anonymous. After you have numbered the page you have just completed, place it in the envelope provided and start on the next

until all papers are completed or the experimenter tells you to stop.

There are two groups in this study, a control group, who simply perform the task just described, and an experimental group, who will also do the above mentioned task but in addition receive a \$1.50 for each page completed without an error. Individuals are assigned to each group purely by chance. If you have any questions please ask them now. If you have no desire to be in the experiment you may leave at any time. If you are ready to continue inform the experimenter and he will flip a coin to decide whether or not you will be in the control or experimental condition. Thank you.

(CONTROL GROUP)

INSTRUCTIONS, PLEASE READ CAREFULLY.

Thank you for participating in this study. We are interested in task performance. The tasks are to proof read and solve problems until the experimenter tells you to stop. You will be given sheets of paper some of which will have arithmetic problems to solve while others will consist of excerpts from a history text that contains a number of typographical errors. Take each sheet in sequence, either solve the problems (rounding to three decimal places) or in the case of the proof reading task, indicate the typographical errors by circling them with the pen provided. As soon as you have finished each page, place a three digit number in the upper right hand corner. This number can be any you wish to make up, just be sure the same one appears on each page. This allows us to keep all the pages done by the same person together, while making sure the person remains anonymous. After you have numbered the page you have just completed, place it in the envelope.

provided and start on the next until all papers are completed or the experimenter tells you to stop.

If you have any questions please ask them now. If you have no desire to be in the experiment you may leave at any time. If you are ready to continue inform the experimenter. Thank you.

• APPENDIX C •

QUESTIONNAIRE.

The following questionnaire is an attempt to find out you perceptions of the experiment you have just completed. If the experiment was conducted efficiently, if the instructions were clear, etc. Hopefully this information will help in the construction of future experiments. Thank you.

1. How many conditions did the experiment have?

- | | |
|---------|----------|
| a. Four | d. Three |
| b. Two | e. Five |
| c. One | f. None |

2. Which condition were you in?

- | | |
|------------|----------|
| a. Control | d. Team |
| b. Reward | e. Group |
| c. Shock | f. None |

3. How were you assigned to your condition?

- | | |
|---------------------------|----------------|
| a. Pre-selection | d. Your choice |
| b. Chance | e. Don't Know |
| c. Experimenter
Choice | f. Other |

4. Which condition would you have preferred to have been in?

- a. Shock _ d. Team _
- b. Control _ e. Other _
- c. Reward _

5. Did you think the experiment was ...? _____

(Circle the appropriate number)

Example, Spongy 1 2 3 4 5 6 7 Not spongy.

- a. Interesting 1 2 3 4 5 6 7 Dull.
- b. Pleasant 1 2 3 4 5 6 7 Unpleasant.
- c. Excellent 1 2 3 4 5 6 7 Terrible.
- d. Worth doing 1 2 3 4 5 6 7 Not worth doing.

6. Did you find the experimenter to be...?

a. Competent 1 2 3 4 5 6 7 incompetent.

b. Pleasant 1 2 3 4 5 6 7 Unpleasant.

c. Intelligent 1 2 3 4 5 6 7 Unintelligent.

7. When you came to the experiment you felt...?

Good 1 2 3 4 5 6 7 Bad.

8. During the experiment you felt...?

Good 1 2 3 4 5 6 7 Bad.

9. During the experiment you felt...?

Good 1 2 3 4 5 6 7 Bad.

10. How would you rate your performance on the experiment task...?

Good 1 2 3 4 5 6 7 Bad.

11. We may be conducting another experiment involving game of chance, if you could choose your partner, would select someone from the group you were in for the experiment or someone from the other group in the experiment.

a. My own group _ The other group _

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